APPLICATION

FOR

UNITED STATES LETTERS PATENT

TITLE: **MAINTAINING ACCESS TO A VIDEO STACK AFTER AN APPLICATION CRASH**

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MAINTAINING ACCESS TO A VIDEO STACK
AFTER AN APPLICATION CRASH

BACKGROUND

This invention relates generally to systems that use video streams and particularly to techniques for maintaining access to those video streams even after an application

5 using the video stream crashes.

Computer systems are often used to provide a television program on a television or monitor connected to the computer which may include a television tuner card. The combination of television and computer offers many advantages. The

10 computer may provide software which facilitates selection of television programs, for example, using electronic program guides. In addition, the television may receive interactive broadcasts which include television programs with accompanying web content. The web content, which may be

15 related to the television program, may provide additional information while allowing the user to respond to inquiries made during the television broadcast. In addition, links may be provided to enable the viewer to link to Internet web sites related to the broadcaster or the broadcast itself.

20 When an application program calls for television programming, the application program accesses a video stack, a software layer for handling video, which provides a video stream for the application. If the application crashes in the course of the video stream, the video stream may not be

25 properly shut down. As a result, the video stack may not be accessible by another application which has not crashed.

For a subsequent application to access the television video after a crash, it is normally necessary to reboot the computer system to reset the video stack to enable subsequent applications to access that stack. This is
5 awkward for many computer users since the computer user may have other processes ongoing on his or her computer system which then must be interrupted to reboot the computer.

Thus, there is a need for a television video stream system which allows access to the video stack, without
10 rebooting, after an application using the video stack has crashed.

SUMMARY

In accordance with one embodiment, a method for accessing a video stream includes initializing the video
15 stream using a video server when a first application requests video. If the first application crashes, access to the video stream is maintained for a second application through the video server.

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DESCRIPTION OF THE DRAWING

Figure 1 is a schematic depiction of the interaction of a pair of applications with a video server and a video stack in accordance with one embodiment of the present invention;

25 Figure 2 is a flow chart showing the operation of the system shown in Figure 1; and

Figure 3 is a block depiction of a computer implementing one embodiment of the present invention.

DETAILED DESCRIPTION

An application can access television video through a
video server operating through a separate video window at a
memory address space distinct from the memory address space
5 of the video window used by the application itself, as
indicated in Figure 1. The video server could be a
television video server or a digital video disk (DVD) server
as examples. The application "A", indicated by the block
10, sets up a parent video window 14. The parent video
10 window 14 is passed to a video server 18 which then creates
a child window 19 of the parent window 14. In effect, then
the parent window provides the handle to the child window
which provides the handle to the video stack.

The server 18 then places the video in the child window
15 19. The child window 19 handles the communication between
the server 18 and the video stack 20. The video stack 20
may, for example, be Video for Windows or DirectShow, both
from Microsoft Corporation. Since the window 14 and the
window 19 operate from separate and different address spaces
20 in a computer's memory, if the application A crashes, as
indicated in dashed lines in Figure 1, the window 19 in the
TV server 18 may be maintained.

In prior systems, when the application A crashed, the
window 14, which provided video services, crashed as well,
25 leaving the video stack 20 in an unusable state. Thereafter,
when a separate application, such as the application B in
block 12, attempted to access video services, it was unable
to do so without rebooting the computer.

In the embodiment shown in Figure 1, the application 12
30 may set up its own parent window 14 which then handles the

video window 19 in the TV server 18. The application B has
immediate access the video stack through the server 18
despite the fact that the application A may have crashed and
may no longer be operating. The settings on the server 18
5   and its video window 19 may continue to be maintained
unaffected by the crash of the application A.

Referring now to Figure 2, a software program for
implementing an embodiment of the system described with
respect to Figure 1, begins at 28. An application, such as
10   the application A, connects to a TV server 18, as indicated
in block 30. The application requests video (block 32) and
an inquiry is made to determine whether video is
initialized, as indicated in diamond 34. If so, the video
is deinitialized. This restores the video to a known,
15   stable state. If not, the TV server initializes the video
using the window provided by the application as the parent
window (block 38). The application uses the video for such
purposes as desired, as indicated in block 40.

At diamond 42, an inquiry is made to determine whether
20   the application has crashed. The crash detection may be
implemented, for example, by monitoring exception handler
codes. The software may tie into the operating system and
wait for a pre-set exception handler code indicative of a
crash. When a particular code is detected, the software
25   determines that a crash is occurring in the application
program. In block 48, the video stack is automatically shut
down and in block 50 the TV tuner card is also automatically
shut down upon detection of a crash.

If no crash is detected, the application eventually
30   requests the TV server to close video when the application

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is done with the video, as indicated in block 44. As long as the operating system is operating correctly, the application leaves the video initialized, as indicated in block 46.

5   In the case of a crash, by shutting down the video stack and the TV tuner card quickly upon detecting the error condition, the video stack may be maintained in a usable state for a subsequent application, such as the application B illustrated in Figure 1. Even though the parent video

10   window 14 may be unusable, the TV server 18 is still running correctly and is able to access the video stack 20 because the server's parent window 19 is operating in a separate address space from the application's window 14.

Video is activated in the windows using handles

15   supplied by the server 18. If there is a crash, the parent window 14 disappears, but the video stack is still connected to the TV server window 19. When a new application starts, it requests video from the TV server 18 and the TV server, unaffected by the crash of the prior application, can then

20   provide a connection to the video stack.

Referring now to Figure 3, an exemplary computer system 51 for implementing an embodiment of the present invention, includes a processor 52 connected to a bridge 54. The bridge 54 is in turn connected to system memory 56. System

25   memory 56 includes a plurality of address spaces including the address spaces 70 and 72. One of the address spaces 70, 72 may be used for the window 19 and the other may be used for the window 14.

The bridge 54 connects to a conventional bus 58. A

30   tuner card 62 may be connected to the bus 58. A display 64

such as a television may be connected to the tuner card 62.

A bridge 60 is also connected to the bus 58. The bridge 60 couples a hard disk drive 66 which may store a plurality of software programs including the software to implement the server 18 and video stack 20 as well as an application program 68, which could correspond to the application A or the application B in Figure 1.

While the present invention has been described with respect to a limited number of embodiments, those skilled in the art will appreciate numerous modifications and variations therefrom. It is intended that the present application cover all such modifications and variations that fall within the true spirit and scope of the present invention.

What is claimed is:

6